REMARKS

Claims 1-17 are pending in this application. The Examiner has noted that a certified copy of the 10138919.1 application has not been filed. The drawings are objected to as not containing sufficiently descriptive labels, and for not showing the method steps of the claims. The abstract is objected to because its length exceeds 150 words. Claim 1 is objected to due to informalities. Claims 1-17 are rejected under 35 USC 112 due to unclear claim elements. Claims 1-4, 6-9, 11, 12, 16 and 17 are rejected under 35 USC 103(a) as being unpatentable over Lofall in view of Hoth. Claims 5, 10 and 13-15 are rejected under 35 USC 103(a) as being unpatentable over Lofall in view of Hoth and further in view of Haseley.

The applicants appreciate the reminder of the need to file a certified copy of the 10138919.1 application. A certified copy has been ordered and will be submitted in due course.

Replacement sheets 1-3 of the drawings and new sheet 4 are provided herein to overcome the objection under 37 CFR 1.83(a). Sheet 4 includes new FIG. 7 that illustrates the claimed subject matter in the form of a flow diagram. Appropriate specification changes are made herein to add this figure without the addition of new matter.

The abstract has been amended to bring its length to less than 150 words and to eliminate the cited spelling error.

Claim 1 has been amended to correct the antecedent basis concern in line 1 and to overcome the rejections under 35 USC 112. The changes to claim 1 also overcome the rejection of claim 3 under 35 USC 112.

The applicants traverse the rejection of the claims under 35 USC 103 as being unpatentable in view of the combination of Lofall and Hoth. The applicants agree with the Examiner that Lofall "does not explicitly teach changing the second amplitude values of the reference spectrum according to the operating parameters." However, the applicants disagree with the Examiner's interpretation of Hoth as teaching that "the amplitude values of the reference/norm data are changed according to a function of the operating parameters of load and temperature (column 9, lines 27-35)."

The applicants apologize for the following rather lengthy summary of the process of Hoth. However, it is believed necessary to demonstrate the differences between how Hoth and

the present invention treat the relationship between vibration data alarm limits and secondary parameters such as machine load and temperature.

Hoth describes a complex multi-step method that provides a quantitative prediction of the likelihood of a failure, which he calls a "final failure probability sum." (column 13, line 41) Hoth arrives at that numeric value via a series of learning and then monitoring steps. First, in a learning mode, Hoth teaches the steps of:

- gathering raw vibration amplitude data (RD) over a number of frequency ranges (column 8, lines 31-38)

- using only data which satisfies certain stability requirements, generating twelve hour average vibration frequency values with a 95% statistical confidence level. (column 9, lines 7-19 and colun 10, lines 39-50) for each frequency band and each load range. In this step, Hoth recognizes that there is a relationship between vibration amplitude response and machine load. However, Hoth does <u>not</u> use that relationship for the purpose of adjusting an alarm value, but rather it causes him to establish a plurality frequency bands and load ranges so as to be able to judge the stability of the acquired raw data within a plurality of ranges.

- building an hourly reading (HR) table from raw data each hour and checking to see if a sufficient number of the data points are within the confidence interval for each frequency band and load condition. (column 11, lines 27-42)

- only if the machine is running normally and is stable, entering a monitoring mode. (column 11, lines 42-46)

Once in the monitor mode, the machine is evaluated by comparing hourly average data to the confidence intervals (column 11, lines 49-53) through the following steps:

- hourly data is checked against limits that are based upon the confidence intervals, and if the limits are exceeded, a neural processor subroutine is entered for calculating a failure probability. (column 12, lines 9-32) Note that no limit is changed during this step, or in any step of the process. Each band of hourly data is compared to a respective confidence interval for each vibration band to generate a weighted probability of machine failure. (column 13, lines 1-13)

- applying load to current ratio and differential temperature factors to the weighted probabilities to arrive at a "final failure probability sum". (column 13, lines 33-41) In this manner, vibration data exceeding the confidence interval is caused to have varying effects on the

final failure probability sum depending upon the load to current ratio and the differential temperature.

Note that the method of Hoth necessitates the processing of multiple sets of data over a number of load ranges. Furthermore, Hoth never adjusts the confidence interval (i.e. alarm curve) in response to load to current ratio or in response to temperature, but rather, he uses these parameters only to adjust the impact of the calculated failure probability values.

In contrast to the method of Hoth, claim 1 of the present invention provides a much simpler method for evaluating an object to be tested. Claim 1 includes the step of "automatically changing ... the alarm curve according to a second operating parameter." Hoth never changes an alarm curve; rather, he teaches the necessity of splitting the load parameter into a plurality of ranges in order to provide for a degree of stability in the measured amplitude data. The present invention avoids the necessity of processing multiple sets of data as must be done in the method of Hoth.

Furthermore, the CAFC decision in In re Kumar, no. 04-1074, states "To render a later invention unpatentable for obviousness, the prior art must enable the later invention." The Hoth reference fails to enable the present invention since it fails to teach any method for automatically changing the amplitude values of an alarm curve. Thus, the combination of Hoth and Lofall does not support the rejections under 35 USC 103.

New claims 18 and 19 have been added. Independent claim 18 includes the limitations of normalizing actual vibration amplitude data verses frequency to account for a rotating speed that is different than a rotating speed of an alarm curve, and further adjusting the alarm curve to account for the difference between load values between the actual data and the alarm curve. The cited prior art patents fail in combination to teach this combination of limitations, since nothing in the prior art describes first normalizing actual data to account for rotating speed and then comparing the normalized data to an alarm curve that has been normalized in response to a load value.

Dependent claim 19 adds the further limitations of establishing the alarm curve for a first temperature; gathering the actual vibration amplitude data verses frequency at a second temperature different from the first temperature; further adjusting the alarm curve to account for the difference between the first and second temperatures; and comparing the normalized data and the further adjusted alarm curve to evaluate the rotating machine. The Hoth reference actually

teaches away from this combination, since Hoth uses temperature data as a multiplier for adjusting the calculated probability of failure numbers, whereas claim 19 uses temperature data as a basis for adjusting an alarm curve. Thus, claim 19 provide an additional independent basis for a finding of patentability.

Conclusion

The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper, including the fees specified in 37 C.F.R. §§ 1.16 (c), 1.17(a)(1) and 1.20(d), or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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